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## Ecology, preimaginal stages of *Chrysolina (Altailina) dudkoi* MIKHAILOV, 2000, and keys to similar species from the Altai Mountains (*Coleoptera: Chrysomelidae*)

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ABSTRACT. Ecology, distribution, description of last and first instar larvae are given for *Chrysolina dudkoi* MIKHAILOV from the Western Altai. A key to imagines of *Chrysolina montana* GEBLER, *Ch. schewyrewi* JACOBSON and *Ch. dudkoi* and a distribution map of these three species are provided, as well as a key to larvae of *Chrysolina montana*, *Ch. dudkoi* and *Oreina basilea* GEBLER are provided. A new name *Chrysolina kholsunica* nom. nov. is proposed for *Ch. ogloblini* MIKHAILOV, 2000 not *Ch. ogloblini* (TER-MINASSIAN, 1950)

Key words: entomology, ecology, preimaginal stages, morphology, *Coleoptera*, *Chrysomelidae*, *Chrysolina*, Altai Mts.

Last year I described several new species from the Altai Mts. and the Sayans and established a new subgenus *Altailina* (MIKHAILOV 2000). In May - June of 2000 we organized an expedition to Eastern Kazakhstan where we found one of the newly described species *Chrysolina (Altailina) dudkoi* mihi in its typical habitat (figs 1 – 6) and had the opportunity to study its ecology. Additional data on the distribution of this species were placed at my disposal by Roman Yu. DUDKO (Siberian Zoological Museum, Novosibirsk), who also visited the Western Altai in summer 2000.

A sample of two dozen specimens from the Ivanovsky mt. range was placed in a rearing cage, the host plant was also dug up and all this was delivered to Yekaterinburg. The plants were transplanted in the laboratory, rearing cages were attached to them, and live beetles (only 9 specimens survived the journey by

railway) were feeding on them for a month. Several larvae emerged already during the way and died (this species is ovoviviparous). The next emerging larvae (up to 15) were put in a separate rearing cage and three of them grown to the last instar (early August). When the leaves of natural host plant were entirely eaten up, the larvae were fed with a related plant *Sonchus* sp. (*Asteraceae*).

#### ECOLOGY

**Distribution:** Western Altai Mts. from Tigiretsky mt. range in the North to Ivanovsky mt. range in the South (see the map on fig. 7.).

**Observations:** From 30<sup>th</sup> of May (rare findings) till 7<sup>th</sup> of June (in mass) in the South of distribution area and till the third decade of June in the North.

**Variability:** Males: body length -  $6.6 \pm 0.2$  (min – 6.0; max – 7.1); width –  $4.2 \pm 0.1$  (min – 4.0; max – 4.5). Above metallic-bronze with coppery pronotum, coppery with bronze pronotum, bronze with greenish or violet tinge; entirely coppery specimens are strongly shining.

Females: body length -  $7.3 \pm 0.3$  (min – 6.9; max – 8.0); width –  $4.8 \pm 0.2$  (min – 4.2; max – 5.3). The same colour morphs as in males. 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 5<sup>th</sup> (or 3<sup>rd</sup>, 5<sup>th</sup> and 7<sup>th</sup>) intervals on elytra from slightly to distinctly convex, very rarely ridge-shaped.

Pronotum sides in both sexes widely rounded, but in some specimens from the Tigiretsky mt. range they are almost straightly narrowed from base to fore margin.

**Host plant** - *Saussurea latifolia* LEDEB. (*Asteraceae*).

The species inhabits mountain habitats ranging from clearings in the fir forest (ca. 500 m a.s.l.) to subalpine meadows (ca. 1500 – 1950 m a.s.l. on various ridges), being the most abundant on sunny, wind protected slopes. It feeds only on *Saussurea latifolia*; during a mass-mating may be found also on *Rhaponticum carthamoides* (WILLD.) ILJIN (*Asteraceae*) and *Paeonia anomala* L. (*Ranunculaceae*), but does not feed on them.

In the community of leaf beetles of subalpine meadows of the Ivanovsky mt. range *Oreina basilea* GEBLER is the dominant (very high density) and feeding also on *Saussurea latifolia*; *Apterocuris sibirica* GEBLER (high density) feeds on leaves of *Delphinium*. *Chrysolina dudkoi* is usually abundant, but sparsely distributed – not more than 2-3 specimens per plant. It stays in axils of leaves in cloudy weather or feeds on the upper side of leaves in sunny weather. Another species, *Chrysolina schewyrewi* Jacobson, very similar in habitus to *Chrysolina dudkoi* was found in sympatry, but much more rare (ratio ca. 1 : 27). On sparse vegetation in wind exposed areas *Chrysolina graminis artemisiae* MOTSCH. is usual on tansy (*Tanacetum* sp.). All these species penetrate mountain tundra together with their feeding plants along streams. There are specimens of *Chrysolina marginata* (L.), *Ch. haemochlora* GEBLER and *Cystocnemis discoidea* GEBLER are found together with them.

Below I give a key to *Chrysolina dudkoi* mihi, *Chrysolina schewyrewi* JCBS. and *Chrysolina montana* GEBLER, which are all very similar to one another, feed on *Saussurea latifolia* and each two of them may be found in sympatry (except for *Chrysolina dudkoi* and *Chrysolina montana*, which proved to be vicarious). I

examined an extensive material from the collection of Siberian Zoological Museum (SZM), our own collection and published data (JACOBSON 1895, 1902; KONTKANEN 1957) to construct the key and clarify detailed distribution. (fig. 7).

# KEY TO IMAGES

The key enables not only to determine males, but scattered statements make it possible to distinguish females. Formerly females of the first two species were indistinguishable (MEDVEDEV & DUBESKO 1992).

Wings absent or reduced, above metallic-bronze, coppery or with greenish or violet tinge; lateral calli of pronotum not separated from disc.

1 (4) Elytral puncturation confused, only some punctures form short fragments of rows on disc.

2 (3) Pronotal puncturation larger. Scutellum widely rounded. Fore tarsi strongly dilated: 3<sup>rd</sup> article the broadest, distinctly wider than the 1<sup>st</sup>, which has a shape of equilateral rounded triangle. Hind tarsi distinctly narrower than fore ones, especially 3<sup>rd</sup> article. Apex of 1<sup>st</sup>, 2<sup>nd</sup> and sometimes 3<sup>rd</sup> articles of antennae entirely rufous. Presutural sulcus on apical slopes of elytra distinct and usually deepened. The last abdominal sternite with longitudinal sulcus. Aedeagus (fig.8). North and Central Altai, Abakansky mt. range, Kuznetsky Alatau mts., Gornaya Shoria.

..... *Chrysolina (Bechynia) montana* (GEBLER, 1848)

3 (2) Pronotal puncturation smaller. Scutellum triangular. Fore tarsi moderately dilated: 3<sup>rd</sup> article is only slightly wider than the 1<sup>st</sup>, which has a shape of isosceles prolonged triangle. Hind tarsi indistinctly narrower than fore ones. 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> articles of antennae rufous only below. Presutural sulcus on apical slopes of elytra absent. The last abdominal sternite feebly arcuately truncated on apex. Aedeagus (fig.9). North, Central, West, South-West and South-East Altai, extreme south of Kuznetsky Alatau mts., Gornaya Shoria, the Sayans (Kryzhina mt. range), Tomsk, Yenisei valley northwards to Khantaika.

..... *Chrysolina (Heliostola) schewyrewi* (JACOBSON, 1895)

4 (1) Elytral punctures arranged in paired slightly confused rows, which can be seen even with naked eye. Odd intervals sparsely punctate and seems or are slightly convex. Fore tarsi strongly dilated: is only slightly wider than the 1<sup>st</sup>, which has a shape of equilateral rounded triangle. Hind tarsi indistinctly narrower than fore ones, but 1<sup>st</sup> article is of almost the same breadth. Presutural sulcus on apical slopes of elytra feeble. The last abdominal sternite with shallow rounded-triangular depression at middle near apex. Aedeagus (fig.10). West Altai.

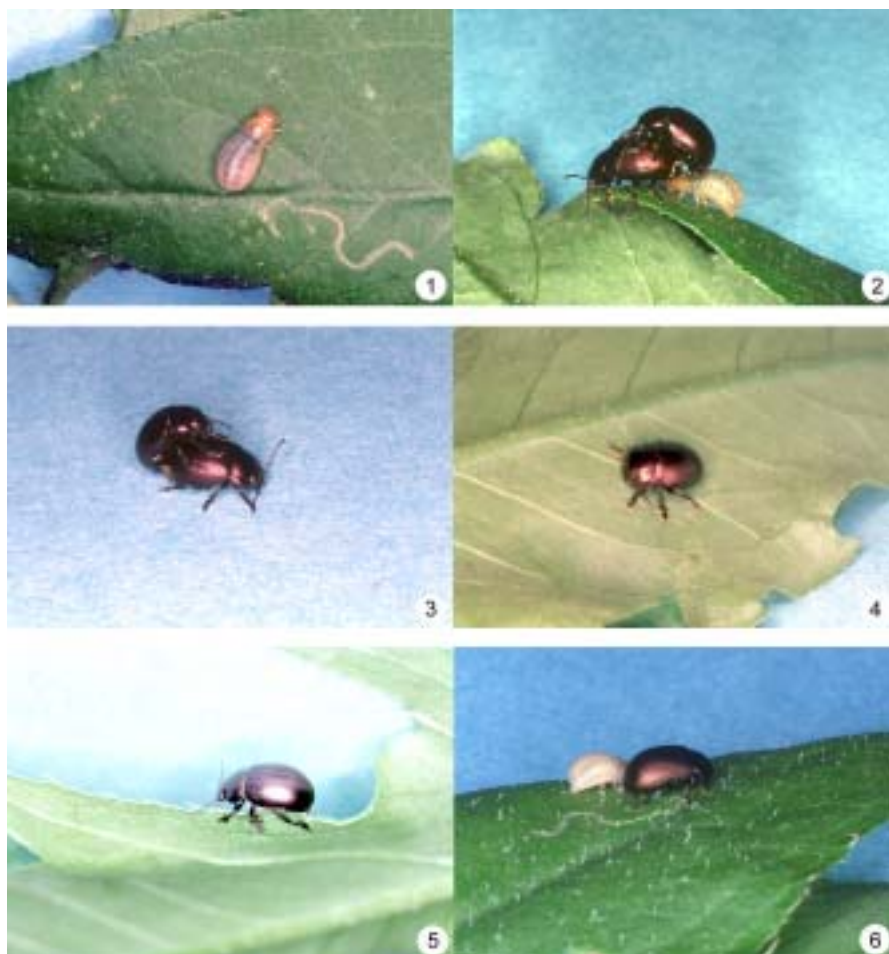
..... *Chrysolina (Altailina) dudkoi* MIKHAILOV, 2000

## DESCRIPTION OF THE LAST INSTAR LARVA

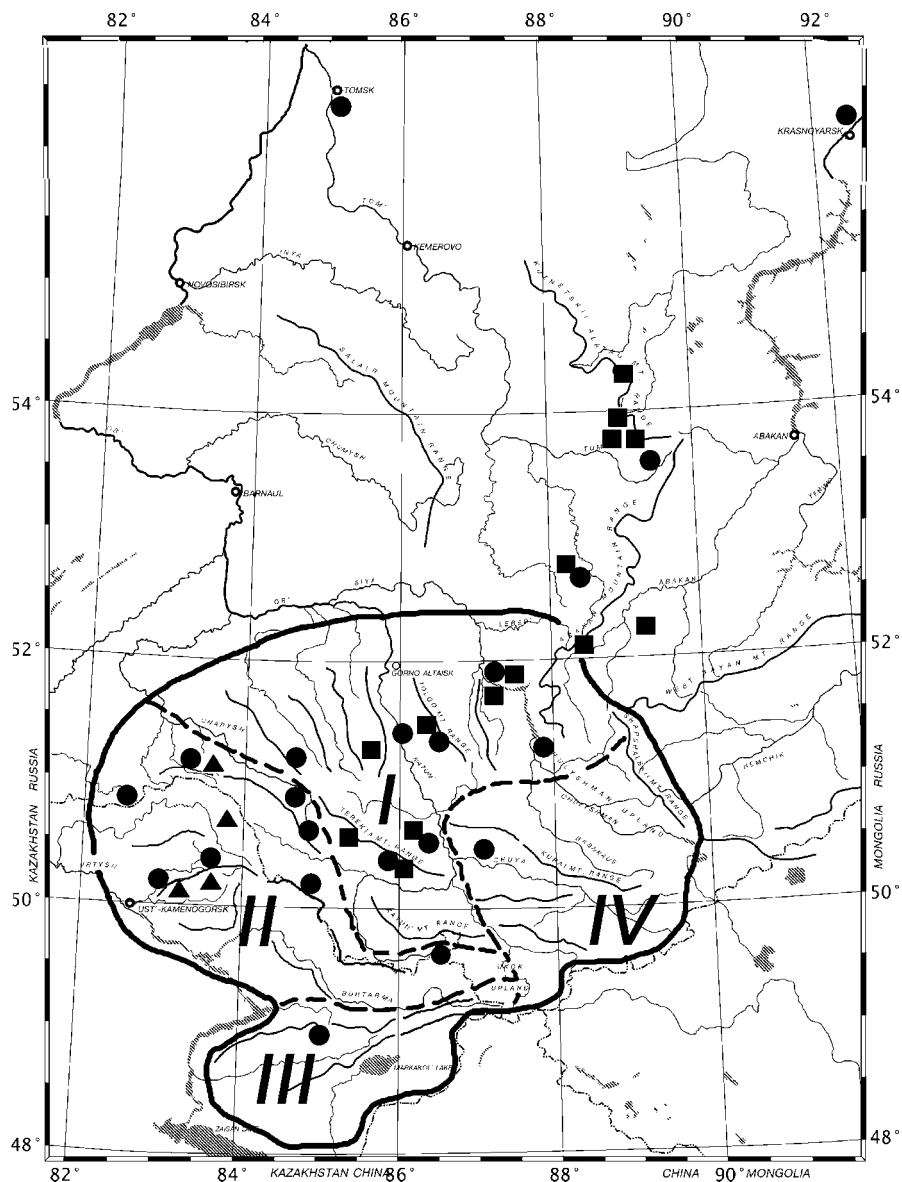
Terminology and description scheme follow MEDVEDEV & ZAITZEV (1978), ERBER & MEDVEDEV (1993).

Body yellowish white with small light bristles (seen only under magnification), head capsule well sclerotized, brownish yellow. Length of body – 7.0 mm, breadth of head capsule – 2.0 mm.

Head (fig. 11) transverse; vertex impressed with irregular polygonal (mostly pentagonal) patterns with small brown spots inside and densely covered with numerous (more than 40 pairs) short setae. Epicranial suture short; frontal sutures thin, straight and indistinct, diverging in an acute angle in basal part than divaricate



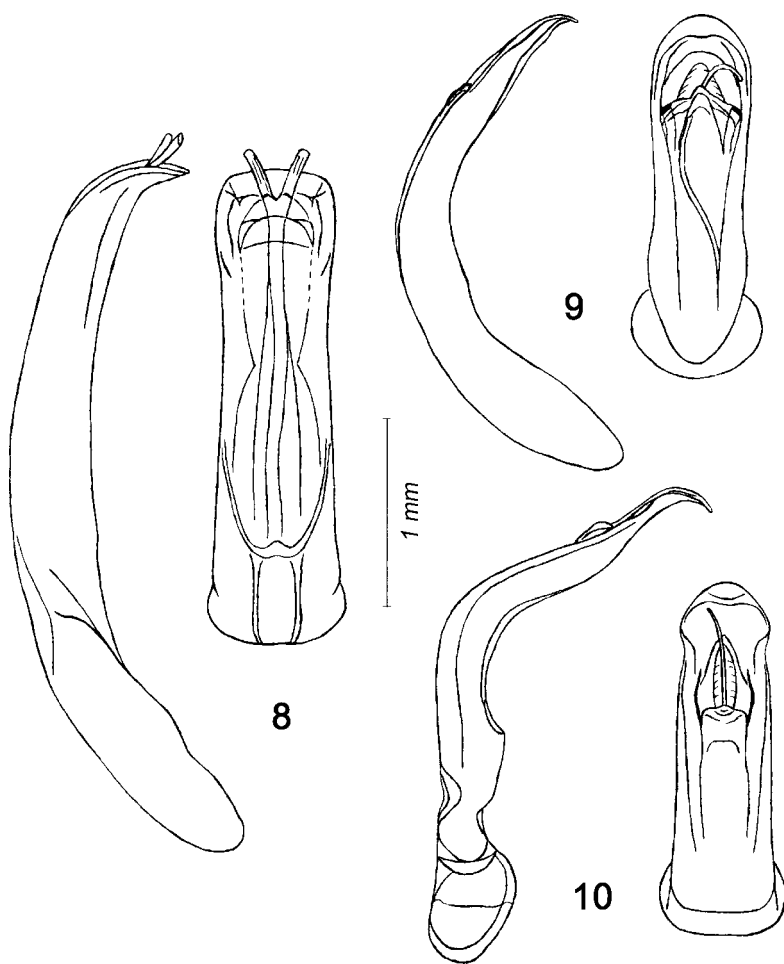
1-6. *Chrysolina dudkoi*, alive beetles and third instar larvae



7. Distribution of *Chrysolina schewyrewi* Jcbs. (circles), *Chrysolina montana* Gebler (squares) and *Chrysolina dudkoi* mihi (triangles) in the Altai Mountains (borders of „proper” Altai in Russia and Kazakhstan shown by solid line) and adjacent ranges of South Siberia. Subprovinces of Altai are shown by dotted line: I – North-Central Altai; II – West Altai; III – South-West Altai; IV – South-East Altai – South Tuva (Orographic scheme and faunistic subprovinces after Dudko 1998 with additions)

into obtuse angle. Frons with 40-44 setae, convex along median line, declivities covered with deep distinct wrinkles, transverse or inclined to the middle of anterior margin; under and above frontal sutures wrinkles smaller and parallel to them. Fore margin emarginate with brown at angles, the deepest depressions are near its middle. Clypeus with thin reticulate microsculpture and 6 setae in a row. Only fore margin well sclerotized and emarginated with brown.

Labrum (fig.12) with fore margin well sclerotized and 5 thick marginal setae on each side; deep median arcuate incisure dark brown and bearing 2 short setae. Surface with 4 long discal setae and only two pores with short setae just before the incisure. Antennae situated on large palpifers, 3-segmented, 2<sup>nd</sup> segment with conical sensilla.

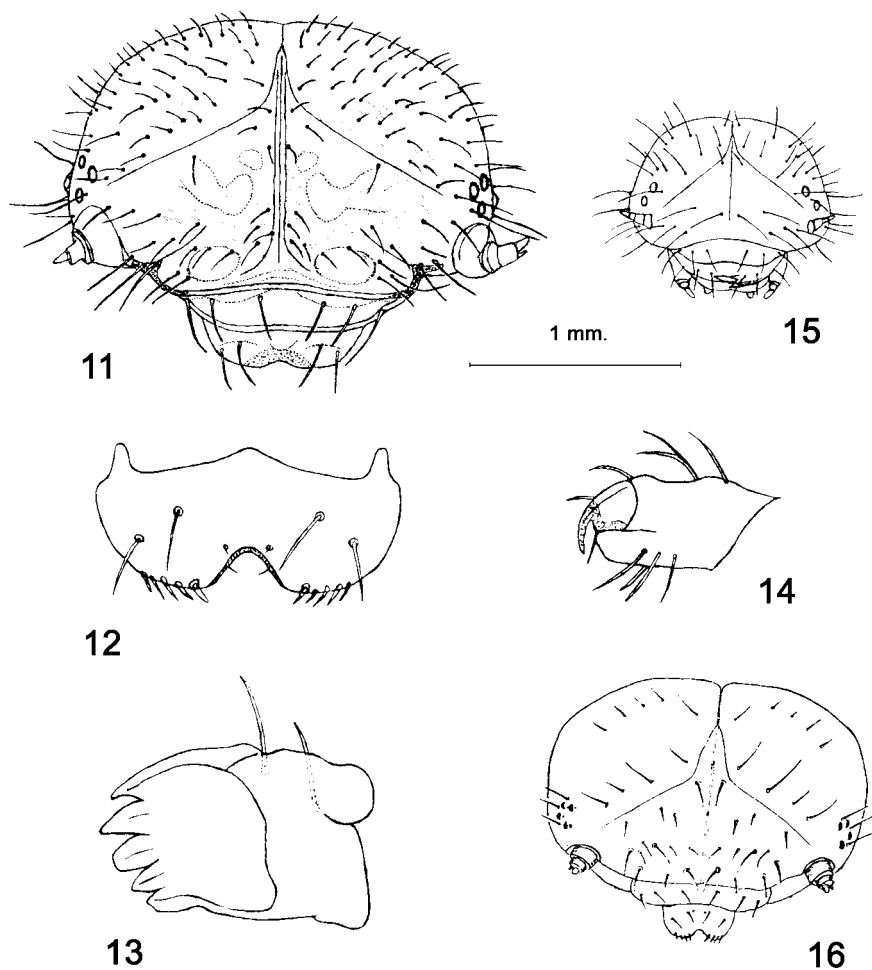


8-10. Aedeagus (lateral and dorsal view): 8 - *Chrysolina montana*; 9 - *Chrysolina schewyrewi*; 10 - *Chrysolina dudkoi*

Mandibles (fig. 13) broad, dark brown, with 3 pointed and 2 truncate teeth and 2 long setae on outer margin.

Thorax and abdomen: Prothorax (fig.17) with transverse sclerite, divided in the middle with a light stripe, surface with sparse sclerotized grains and numerous short setae (about 110 on each half), not arranged in rows; the setae being longer only on lateral part.

Meso-, metathorax and abdominal tergites 1-6 with distinct transverse fold in the middle, tergal area without sclerites. Meso- and metathorax with dorso-lateral



11-14. *Chrysolina dudkoi*, last instar larva: 11 – head: chaetotaxy and microsculpture of frons; 12 – Labrum; 13 – right mandible from inside; 14 – tibiotarsus of middle right leg; 15 – first instar larva: head capsule. 16. *Oreina basilea* GEBLER, last instar larva: head (16 - after MEDVEDEV & ZAITZEV 1978)

sclerites distinct (less so on metathorax), ovate and convex, more or less rugulose, having each 12-13 long setae. Mesothorax with 8-10 setae in anterior row and 20 setae in posterior row; metathorax and 1<sup>st</sup> abdominal tergite with numerous short setae arranged in paired confused rows (fig.18-20). Epipleural area with ca. 10 short setae. Stigmae with dark sclerotized ring.

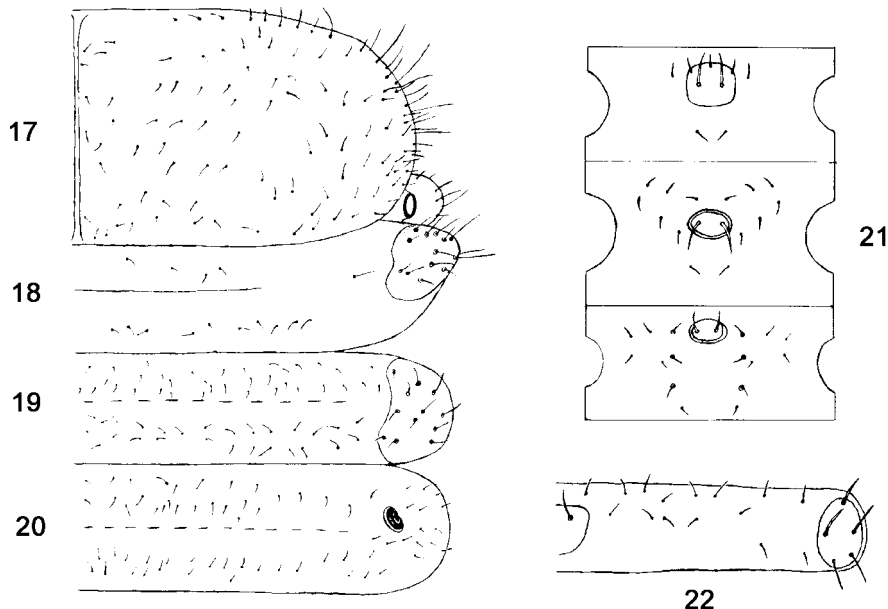
Segments of thorax in sternal area (fig. 21) with distinct but feebly coloured ovate central sclerites, bearing each a pair of long setae; abdominal segments in sternal area (fig. 22) with indistinct central sclerites, bearing each two long setae. Hypopleural area with distinct ovate sclerite with 5 long setae.

Tibiotarsus (Fig. 14) short, claw strongly curved with obtuse tooth at base and short seta.

Material: Eastern Kazakhstan, Ivanovsky mt. range, Prokhodnoy Belok mt., subalpine meadow, h~1650 m. a.s.l. , Yu.E.MIKHAILOV leg. (beetles collected in natural habitat 6-7.VI.2000, 15 larvae emerged in the middle of June, 3 last instar larvae examined reared in laboratory till early August 2000).

#### NOTE

First instar larva with long light setae, on meso-, metathorax and abdominal tergites beeing situated on brownish sclerite-like spots. Head capsule is shown in fig. 15. Breadth of head capsule – 0.9 mm, body length – 3 – 4.2 mm.



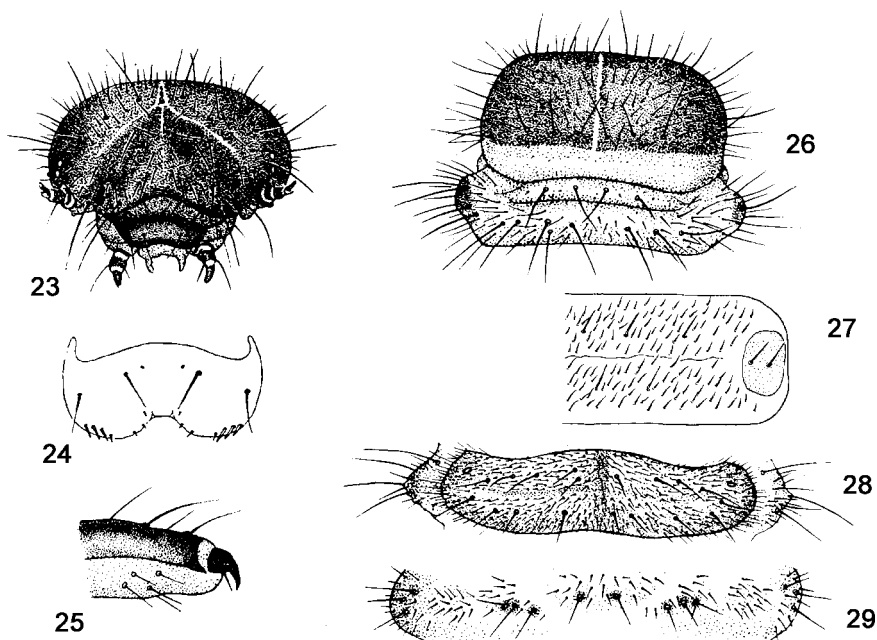
17-22. *Chrysolina dudkoi*, last instar larva: 17-20 – tergites of thorax and abdomen (17 – prothorax; 18 – meso-; 19 – metathorax; 20 – first abdominal segment); 21-22 – sternites of thorax and abdomen (21 – thorax; 22 – fourth abdominal segment)



# SYSTEMATIC POSITION

Larva of *Chrysolina dudkoi* mihi resembles that of *Ch. montana* GEBLER and *Oreina basilea* GEBLER (described by DOLGIN & MEDVEDEV 1974a,b; MEDVEDEV & ZAITZEV 1978) in the absence of sclerite-like spots on tergites. All these species feed on *Saussurea latifolia*, *Ch. dudkoi* was never found together with *Ch. montana*, but both these species share habitats with *Oreina basilea* GEBLER. Three species can be easily distinguished by the following key (larva of *Chrysolina schewyrewi* JCBS. is unknown) :

- 1(4) Head capsule with dense secondary setae (not less then 40 on frons).
- 2(3) Body dirty grey, prothorax and legs fulvous, head capsule dark brown. Prothoracal sclerite with ca. 20 primary setae on each half beeing very long and situated mostly at margins. On meso- and metathorax macrosetae form two transverse rows, microsetae numerous. Claw without tooth.  
..... *Chrysolina montana* (GEBLER) (figs 23-29)
- 3 (2) Body yellowish white, prothorax and legs flavous, head capsule brownish yellow. Prothoracal sclerite with ca. 10 primary setae on each half not very long and situated only at lateral margins. Meso- and metathorax only with microsetae on disc. Claw with quadrangular tooth.  
..... *Chrysolina dudkoi* MIKHAILOV (figs 11-14, 17-20)



23-29. *Chrysolina montana*, last instar larva: 23 - head; 24 - labrum; 25 - tibiotarsus; 26 - pro- and mesothorax; 27 - metathorax; 28 - abdominal tergite; 29 - second sternite of abdomen (23, 25, 26, 28, 29 - after DOLGIN & MEDVEDEV 1974b; 24,27 - after MEDVEDEV & ZAITZEV 1978)

- 4(1) Head capsule with sparse secondary setae (26 setae on frons). Body including head uniformly yellowish, upper side slightly darker than head and pronotum.  
 .....*Oreina basilea* (GEBLER) (fig. 16)

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#### NOMENCLATORIAL NOTE

In my previous paper on *Chrysolina* from Altai and Sayany Mountains I described a new species *Chrysolina ogloblini* (MIKHAILOV 2000), but the name has been preoccupied by *Chrysolina ogloblini* (TER-MINASSIAN, 1950). I am grateful to Dr. Lev MEDVEDEV (Moscow), who first informed me of this. A new name is proposed here:

*Chrysolina kholsumica* **nom. nov.** for *Ch. ogloblini* MIKHAILOV, 2000 (not TER-MINASSIAN, 1950, *nom.praeocc.*).

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